THE OHIO COAL FIELD.

BY ANDREW ROY.

The great Appalachian Coal Field, the largest known coal field in the world, of which the Coal Measures of Ohio constitute a part, extends through portions of nine different States, viz., Pennsylvania, Maryland, West Virginia, Virginia, Kentucky, Ohio, Tennessee, Alabama, and Georgia, and occupies an area which has been variously estimated at from 50,000 to 58,000 square miles. From 10,000 to 12,000 square miles of this area are situated in Ohio. More than one-fourth of the State is therefore underlain with coal-bearing strata. The western margin of the Ohio portion of the great coal field runs through the counties of Trumbull, Geagua, Portage, Summit, Medina, Wayne, Holmes, Knox, Licking, Perry, Hocking, Vinton, Jackson, Pike, and Scioto, and the Coal Measures are spread over all the territory lying east of this line of outcrop to the State line at the Ohio River.

On the margin of the Coal Measures of Ohio in the above-named counties, there is only one workable vein of coal met—the lower seam, or Coal No. 1 of the geological nomenclature; and owing to the peculiar conditions under which this coal was formed, it is often wanting where the practical miner, unacquainted with the peculiar irregularities under which the coal was deposited, would unhesitatingly assert its existence. The coal strata dip at the rate of about 30 feet to the mile, in an easterly direction (the line of dip being south 65 east), and the lower coal which crops

out on the western flank of the coal measures of the State is carried 1,500 to 1,600 feet below the highland in the counties of Belmont, Monroe, Washington and Meigs, on the Ohio River. The dip of the strata is irregular, being at some points as high as 80 or 100 feet to the mile, while at other points it is not more than 10 or 20 feet to the mile. Frequently reverse dips are met, causing the strata to form a series of synclinal and anticlinal waves.

The Coal Measures of the State are divided into three series, namely: "The Lower Measures, the Barren Measures, and the Upper Measures." The lower measures are about 500 feet in thickness, the barren measures 400 to 500 feet, and the upper measures 600 feet thick. All the beds of coal in present course of development are drawn from the upper or lower coal measures, the barren measures, as the name indicates, containing little coal of sufficient thickness for the immediate purposes of the miner.

The coals now being worked are mainly drawn from four or five different seams, Nos. 1, 2, 6, 7 and 8 of the geological nomenclature. In mining districts, however, the coals are known by other names than numerals, as, for example, the Brier Hill coal, the Massillon coal the Nelsonville coal and the Ohio River coal, and so on, and so they will ever be known; these names indicating the districts from which the coals are mined, and giving them a commercial value which dealers easily comprehend.

The coal beds in their progress through the coal area are very changeable in their character and thickness. Thus, the Brier Hill coal is one of the purest and best seams in the State; while the Mineral Ridge coal, although geologically the same bed as the Brier Hill, and separated from the Brier Hill not more than one mile, differs greatly in its chief properties and adaptability for various uses, and is greatly inferior in quality, the Brier Hill coal being a long grained block coal, hard, firm, compact, a homogeneous bed, and adapted for furnace use in a raw state; while the Mineral Ridge variety is a short-grained, friable, tender coal, and totally unfit for furnace use. It is also divided into two benches by a band of shale from 1 to 4 feet in thickness, upon which rests a stratum of blackband ore from 1 inch to one foot in thickness.

The existence of coal in Ohio was noted by the early frontiersmen and by travelers from the time of the earliest settlements. In 1755 a seam of coal was discovered on fire near Bolivar, in Tusca-

rawas county. A map of the western country, now in possession of Judge T. H. Ewing, of Lancaster, published in the year 1788, notes several sections of iron ore beds, and Harris, in his tour in 1803, states that on the banks of the Hockhocking, "quarries of excellent free-stone, beds of pit coal, iron ore, lead, strata of white and blue clay of excellent quality, red bole, and many other useful fossils are found."

Some of the pioneer miners of the State still survive. Coal was mined by stripping near the village of Talmadge, in Summit county, as early as 1810. Mr. Asaph Whittlesey, father of Col. Charles Whittlesey, of Cleveland, and Mr. Henry Newberry, father of Dr. J. S. Newberry, were the pioneer miners of Eastern Ohio, and Col. Whittlesey has published a very interesting account of the discovery and development of the coals of that part of the State. The first mines opened by drifting in this region were operated by Messrs. Asaph Whittlesey and Samuel Newton in the year 1820, the coal being sold exclusively for blacksmithing purposes. In 1828 the first shipments were made to Cleveland, from the mines of Mr. Henry Newberry, with the object of supplying the lake steamboats with coal, but wood was so abundant and cheap that the coal found little sale. In noting this fact in my fourth annual report, as Inspector of Mines (1877), I received the following letter from Mr. H. V. Bronson, of Peninsula, Summit County, who took the first boat-load of coal to Cleveland:

PENINSULA, SUMMIT COUNTY, OHIO, April 8, 1878.

ANDREW ROY, ESQ.:

Sir:—Not long since I saw in the papers that in your annual report, as State Inspector of Mines, that the first coal shipped by canal to Cleveland, was in the year 1828, and by the late Mr. Henry Newberry, of Cuyahoga Falls, father of Professor Newberry, of Cleveland. I took that coal to Cleveland for Mr. Newberry, it being fifty years ago since it was done. I was then in the seventeenth year of my age, and have resided in this place ever since 1824. There were three of us boys on the boat. One of them was about a year my junior, and now resides in one of the townships of Cuyahoga County, and became a successful inventor and business man. The other one was then in the twelfth year of his age, and is now a lawyer with a lucrative practice, in a beautiful growing city in an adjoining State. On the first day of January last, I made a New Year's call on Prof. Newberry, at his home in Cleveland. A few years ago I presented Prof. Newberry with a lump of coal taken from one of the boat-loads of that coal. As this whole transaction is somewhat remarkable, I have taken the liberty to write you about it, especially as we three boatmen are natives of Cuyahoga County.

Yours, respectfully, H. V. BRONSON.

The Talmadge Coal Company was organized in 1838, and opened mines on Coal Hill, from which most of the coal was mined for the Cleveland market, until the year 1845. The coal on the property of this company was discovered by Mr. H. F. Wright, in 1825, while digging a ground-hog out from under a stump. The first working was done by stripping the vein, and quarrying it out with pick-axes. In 1832 the Ohio Canal reached the coal fields near Massillon, and the mines of this region were opened by Cyrus Mendenhall. In 1845 David Tod, afterwards Governor of Ohio, commenced shipping by canal from the mines of Brier Hill to Cleveland.

The late President Garfield was, in early youth, a canal boat driver from the mines of Gov. Tod at Brier Hill, to Cleveland. He was then 15 years of age, and had already given evidence of earnestness of character and a desire to obtain an education. Gov. David Tod told the writer of this article, that after the Brier Hill coal was fairly introduced in the Cleveland market, the demand for it was so great that he could not supply orders, and was urged to load a boat on Sunday. He went down to the canal to consult the boatmen on the subject. All the employes af the boat, except young Garfield, were engaged playing cards, while the driver boy was found on the front of the boat, alone, intently studying a history of the United States. Garfield's name was not in that history, added Gov. Tod, but the future student of American history will find it there.

The first coal mined at Mineral Ridge occurred in the year 1835, the mines being opened at Coal Run, on the land of Michael Ohl. In 1833 Roger Hill, a Pennsylvanian, who had formerly mined coal in Beaver County, of that State, moved to Mineral Ridge. He pointed out a coal bed to Mr. Ohl, which, on being opened, proved to be four feet thick. Hill, who was employed to open the mine, in drifting into the hill, selected a square and heavy piece of the mineral, which differed in weight and appearance from the body of the seam, and carried it home to test its qualities. The piece refused to burn, and was pronounced bastard cannel, or black stone. It was afterward left unwrought in the mine, forming the floor of the excavations. The main main part of the coal found ready sale for blacksmithing and domestic purposes, and in 1857 the first shipments were made to Cleveland.

In 1854 John Lewis, an English miner, who had mined blackband ore in the old country, settled at Mineral Ridge. One day, while digging up the floor of his room to set a prop, he was struck with the similarity of the floor to the blackband ore in Victoria mines in England. He informed the proprietors of the mine, Messrs. Ward & Co., that the floor of the mine was a deposit of blackband ore. The proprietors directed the English miner to mine and calcine some of the ore, which was done with promising results. All the workings were now reopened, and the blackband mined out. The stratum of ore ranged in thickness from 1 inch to 1 foot, and after being calcined yielded 50 per cent. of iron. Several years elapsed before the full value of this discovery was appreciated; the art of calcining the ore, and mixing it judiciously not being properly understood. In 1868 the pig iron, made from a judicious mixture of the blackband and Lake Superior ores, produced an iron which was eagerly sought for, and since that time pig iron of the Mahoning Valley has taken the front rank in market, being known and prized as "American Scotch."

The first iron manufactured from raw coal in the United States took place at the Clay Furnace, in the Shenango Valley, on the Pennsylvania side of the State line, in the year 1845, and in the following year Messrs. Wilkinson, Wilkes & Co. built a furnace at Lowell, Mahoning County, Ohio, and used raw coal. Messrs. Wilkinson, Wilkes & Co. contended with the projectors of the Clay Furnace for priority in the use of raw coal, but this honor undoubtedly belongs to the owners of the Clay Furnace in Pennsylvania.

The first furnace built in the Hanging Rock region was erected in Greenup County, Ky, in the year 1815, and was called the Argilite. This was followed by the construction of the Vesuvius, Hecla and Mt. Vernon furnaces, on the Ohio side of the river. These were all cold blast furnaces, and the cold air in several cases was blown through hollow gum logs. The products of the furnaces were cast into salt kettles, coal stoves, and kitchen utensils. The forges were run by water power, and the iron was hammered, instead of being rolled into merchant bar.

In the Hocking Valley region the iron industry dates from 1851, in which year Hocking furnace was built, which was followed by the Logan furnace in 1853, and by the Union furnace

in 1855. These were all cold blast charcoal furnaces, and used the native block ores of the Hocking Valley. Mr. Samuel Baird built the first stone coal furnace in this valley in 1875, three miles north of the village of Gore, in Hocking County.

The development of the coal mines of the Hocking Valley began with the construction of the Hocking branch of the Ohio Canal. The beds of coal of this region laid bare along the swift moving streams, by the action of water, were noted by the first white settlers who penetrated this region, and coal was mined for domestic uses, and for blacksmithing purposes from the time of settlement of the Hocking Valley. In 1831 the salt business, which began to assume importance a few miles above the village of Athens, gave the coal trade some impetus. In 1832 that part of the Ohio Canal, known as the "Side Cut," was completed to Nelsonville, and coal was shipped from the mines there to Columbus in September of that year. The late Thomas Ewing was one of a firm who opened the first mines at Nelsonville, the mincs being located on the Dover run canal basin. Only the lower four feet of the coal bed was mined, the upper bench being left for a roof. Twenty years afterward this mine was reopened, and the top coal, abandoned by the first workers, was taken down and sold. C. Fay, John Carruthers, C. and L. Steenrod, and J. F. Somers were among the pioneer miners of the Hocking Valley. The best market for coal in those early days was Newark, Ohio. Among the early buyers in Columbus were John L. Gill, and the old Neil House.

Coal was first mined in a systematic manner on the Ohio river, below Wheeling, in the year 1833. Samuel Wyllis Pomeroy, of Boston, Mass., purchased the lands on which the Pomeroy mines are now opened, in 1803. In 1818, with the view of opening the mines, he wrote to a merchant in Cincinnati to ascertain the consumption of coal between his property at Pomeroy and the Falls of the Ohio River. He received the following reply:

I am able to communicate to you the following information:

	Bushels.
Cincinnati Steam Mill consumes annually	12,000
Iron Foundry, " "	20,000
Steam Saw Mill, " "	5,000
Manufacturing Co., " "	5,000
Sugar Manufacturing Co " "	2,000
Amount	44,000
In Maysville, or Limestone, used or sold	30,000
In Louisville, used or sold	30,000
Madison Mill (140 miles below Cincinnati)	12,000
Total	116,000

Coal was not used for domestic purposes in the towns of the Ohio River until the year 1833. A steam towboat, named the Condor, built by the Pomeroy Coal Company, in 1835, was the first towboat on the Ohio River. She took the loaded coal boats to Cincinnati and brought back the empty boats to the mines at Pomeroy. The Lake Erie, built at Pittsburgh in 1837, followed the Condor.

The shaft coal at Steubenville was discovered in the year 1829 by Adam Wise, while boring a hole for water for the supply of one of the village manufactories. The coal was met at a depth of 225 feet below the surface, and was pronounced to be 11 feet thick. As the Pittsburgh vein was found in the hills surrounding the village, the idea of sinking a shaft to such a depth was not conceived for many years afterwards. In 1856, however, Mr. James Wallace, proprietor of the Ashland Woolen Mills, began agitating the question of sinking a shaft in the city of Steubenville, the hill banks, owing to the horrible condition of the roads during muddy weather, being unable to furnish the manufacturing establishments a steady supply of coal, and a mining company was soon organized, with Mr. Wallace as President.

Before commencing sinking, it was deemed prudent to drill another hole to the coal, to test the accuracy of the former borings; this time the coal was pronounced 8 feet thick. The shaft was laid out at the upper end of Market street, and and the work of sinking began. Coal was struck in the fall of 1857, but instead of 8 feet it was found to be less than 4 feet. The projectors were greatly discouraged in consequence, but decided to go on with the enterprise. In the following year, Messrs. Boreland, Reynolds and Manful leased the mine for five years, and fitted up the shaft with hoisting machinery and other needed apparatus, and the work of mining was begun. Fortunately for the lessees of the mine who were without former experience in mining, they soon afterwards secured as manager of the works Mr. William Everick, a first-class practical mining engineer from the Midlothian coal fields of Virginia. The enterprise which languished until Mr. Everick assumed charge, was now a success. The superior quality of the coal for every purpose, but especially for making gas and smelting iron, at once established its reputation, and other

similar enterprises were inaugurated. This shaft is still in operation, and is known as the Market Street Shaft; the underground department is under the management of Mr. William Smurthwaite, one of the best practical miners in the State.

There are two seams of coal quite extensively mined in Jackson County—the Jackson coal and the Wellston or Coalton coal. The Jackson coal, which is the lower bed of the State series, was discovered in 1863, by a party of drillers while boring for salt. The coal from this seam is mainly used in the blast furnaces of the county. The Wellston coal was discovered in 1872 by Hon. H. S. Bundy, while exploring for the shaft coal of Jackson, on the lands on which the village of Wellston is now built.

The Milton Furnace and Coal Company sunk the first shaft to the Wellston coal in 1873. This was followed in 1874 by a shaft owned by the Wellston Coal and Iron Company. For some time after the discovery of this coal there was considerable diversity of opinion as to whether the Jackson and Wellston coals were equivalent, but the question was settled in 1877.

Two narrow-gauge railroads were projected to the Jackson County coal field in 1876—the Springfield, Jackson and Pomeroy Railroad and the Dayton and Southeastern Railroad. The Springfield, Jackson and Pomeroy road was projected to reach the Jacksen shaft coal, and the Dayton and Southeastern the Coalton coal. The Springfield road was completed to Jackson in the early part of 1878, but the superiority of the Coalton coal for domestic purposes and for generating steam was so marked that a branch road was at once run up Horse Creek from Jackson, to strike the Coalton seam five miles north of Jackson.

The mines at Coalton were opened in the fall of 1878, and shipments of coal began at once. The Springfield road was, however, in the fall changed to a standard gauge, and little shipping was done before winter. It is now known as the Ohio Southern Railroad.

In the spring of 1880 the Dayton road was finished to Wellston, the two lines meeting at Coalton, making a second outlet for the coal. A dozen mines were opened, and a mining village built, as if by magic, and what was two years ago a rough and poor agricultural country, sparsely settled, was filled up by a new population,

who sought and found treasures in the bowels of the earth. The Dayton and Southeastern road is now part of the Toledo, Cincinnati and St. Louis road.

The coal out-put of the county, which in 1873 did not exceed 600,000 tons, in 1880 exceeded 200,000 tons, and in 1882, 350,000 tons.

A brief sketch of the early development of all the mining districts of the State would make an interesting paper, but would be too long for the space allotted to this chapter.